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ABSTRACT

This evaluation of elementary career awareness programs in Dade County Schools, Florida, compares student performance in seven schools receiving Education Consolidation Improvement Act (ECIA) Chapter II funds and six non-Chapter II schools. Pre-and posttest data from the Dade County Career Awareness Inventory revealed that the two groups did not differ on adjusted mean posttest scores. However, all Chapter II schools showed student performance gains beyond the .01 confidence level while only half the non-Chapter II schools showed performance at this level. Based on performance consistency, it was concluded that Chapter II funding did make a difference. Contrary to expectation, the presence of certified teachers and better equipped laboratories in the Chapter II schools did not explain this difference in consistency. Regression analysis of career lab instructor survey data identified four variables accounting for performance differences: (1) goal agreement between instructor and composite teacher; (2) career station preference diversity; (3) the number of work stations completed by students; and (4) the amount of class time spent on additional career experiences. Correlation of these variables with years of teacher career lab experience imply that with increasing experience, non-Chapter II school instructors' performance improvement will increase uniformity of student performance. An inservice program would accomplish this goal more efficiently. Numerous appendices include the teacher survey questionnaire and statistical analyses and summaries. (BS)

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DADE COUNTY PUBLIC SCHOOLS

EVALUATION OF THE 1982-83 ECIA,

CHAPTER II ELEMENTARY CAREER

AWARENESS PROJECT

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May, 1984

EVALUATION OF THE 1982-83
ECIA, CHAPTER II
ELEMENTARY CAREER AWARENESS PROJECT

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EVALUATION OF THE 1982-83 ECIA, CHAPTER II ELEMENTARY CAREER AWARENESS PROJECT

Executive Summary

In 1982-83 there were eighteen elementary schools in the system with elementary career awareness programs. The Department of Career Education requested Chapter II funds to support career awareness instruction in seven of these schools. A total of \$198,297 was granted, to be used for salaries and fringes for seven teachers, and for supplies and materials.

For comparative purposes, the schools which did not receive Chapter II support were included in the evaluation. Two major differences in the two groups were apparent at the outset: 1) all except one of the 7 Chapter II schools employed certified teachers as career lab instructors, whereas all except one of the 11 non-Chapter II schools employed assistants or aides in that capacity; 2) the Chapter II schools were better equipped than were the non-Chapter II schools in terms of the number of career work stations available for use. These differences reflect the advantages of a relatively long history of special funding for career education programs in the Chapter II schools, six of which had previously received ESAA funds.

Pre and posttest data on student performance were gathered from 5 Chapter II and 6 non-Chapter II schools, using a published, standardized test, the Fadale Career Awareness Inventory. A comparison between the Chapter II and the non-Chapter II schools revealed that the two groups did not differ on adjusted mean posttest scores. The groups did differ, however, in the consistency of performance. Whereas all of the Chapter II schools reflected gains in student performance beyond the .01 level of confidence, only half (3 of 6) of the non-Chapter II schools showed performance at this level. Two of the remaining three non-Chapter II schools failed to show gains at the minimum .05 level. On the basis of consistency of performance it was concluded that Chapter II funding did make a difference.

It was expected that this difference (in consistency) between the two groups would be explained by the presence of certified teachers and better equipped laboratories in the Chapter II schools. However, such was not the case. Although presence of teachers and quality of lab equipment were the most evident observable differences between the two groups, these differences did not, by themselves, contribute to an explanation of differences in test performance.

Using data collected in a survey of career lab instructors, and a statistical technique called regression analysis, four variables were identified that accounted for differences in test performance among the 11 schools. These were:

1. Goal Agreement (GA); a measure of the extent to which an individual instructor - whether certified teacher or not - was in agreement with a composite teacher ranking of selected career awareness goals. This variable was positively related to scores on the Fadale. The implication of this finding is that, although the presence of a certified teacher in the classroom is not critical, an orientation toward the goals of career education, congruent with that of certified teachers, is important.

2. Career Station Preference (CSP); a measure of the degree to which the instructor agreed with a composite teacher ranking of the relative desirability of the individual career work stations. This variable was negatively related to scores on the Fadale. That is, conformity to what teachers as a group tend to prefer in the way of work stations tended to reduce effectiveness in teaching career awareness. The most reasonable interpretation of this is not that teachers as a group make poor choices concerning work stations, but rather that there is considerable diversity in the needs of student populations, and that the effective instructor gives precedence to this fact.
3. Stations Completed (SC); the number of career work stations, on the average, that a student in a given school completed in an academic year. This variable was positively related to scores on the Fadale. The greater the number of stations completed, on the average, the higher the Fadale scores tended to be.
4. Additional Career Experiences(AE); the amount of class time spent on activities such as films, interviews, field trips, and research studies. This variable was negatively correlated with student test performance. This would seem to indicate that such activities as films, field trips, and the like do not contribute to career awareness learning. However, this variable was defined in terms of the amount of time that instructors reported as set aside for these activities. It is possible, therefore, that AE indicates more about how effectively this time is used than about the effect of such experiences on student test performance.

All four of the variables described above were found to be correlated with the number of years of experience teachers had in the career labs. The AE variable was found to be negatively correlated with experience. The newer instructors tend to make the most use of "additional career activities." The other three variables are positively correlated with experience.

The implication is that, with increasing experience, the instructors in the non-Chapter II schools can be expected to perform more like the teachers in the Chapter II schools, with accompanying increases in uniformity of student performance. However, an informed inservice program would provide a more efficient means of accomplishing this goal, and could avoid the undesirable increase in CSP (which while increasing with experience tends to depress student performance).

Based on the analysis, the following recommendations are made:

1. The elementary career awareness project should be refunded for another year.
2. The number of work stations completed per student should be increased where feasible.
3. Time spent on additional career experiences should be monitored to ensure that it is effectively utilized.
4. Requests for support related to the provision of inservice programs for career awareness personnel (such as the request for an educational specialist in the present proposal) should be granted funds.

Background

In 1982-83 there were career awareness programs in 18 Dade County elementary schools. Seven received assistance from Chapter II funds, and 11 did not. Six of the seven receiving Chapter II assistance had previously received ESAA funding. At the request of the Director of Career Education, both groups of schools were included in this evaluation.

The two groups of schools (Chapter II and non-Chapter II) differ in a number of ways, sometimes substantially. Some of these differences, useful as a perspective for the evaluation, are described below.

Table 1 gives selected information on students and classes. Information is for the 4th through 6th grades, which are the grades receiving experience in the career labs. In addition, a few schools in both groups give classroom instruction in the lower grades. Also, not every school includes 4th or 6th grades.

TABLE I

ELEMENTARY CAREER AWARENESS PROGRAM:
CLASS AND ENROLLMENT STATISTICAL SUMMARIES*

	Chapter II			Schools		
	mean	s.d.	n	mean	s.d.	n
Number of students served (Grades 4, 5, 6)	131.43	74.65	7	206.82	95.04	11
Class size	15.29	2.81	7	17.36	8.78	11
Length of class period (in minutes)	47.86	8.59	7	49.55	11.72	11
Classtime per week (in minutes)	112.14	30.12	7	121.82	35.16	11

*Computed from survey questionnaire and/or telephone interview data.

It can be seen from Table 1 that the Chapter II schools serve fewer students on the average, although the large standard deviations indicate that the number varies considerably from school to school in each group.

Average class size is about the same in both groups, but varies greatly in the non-Chapter II schools. The same relationship holds for length of class period. The non-Chapter II schools offer more classtime per week.

Summing up, the non-Chapter II schools tend to serve more students than the Chapter II schools, and have more classtime. However, they tend to vary more on all the items in Table 1. They are more heterogeneous than the Chapter II schools.

Table 2 compares the two groups on the status of their career labs. There are 33 "standard" work stations, which constitute the regular equipment of a career lab. The Chapter II schools have more of these stations (30 v. 24 on the average), and more of the stations they have are serviceable, according to reports of the career lab instructors. Moreover, the Chapter II schools average 3 additional "non-standard" stations per school, as compared to 1 for the non-Chapter II schools.

TABLE 2
ELEMENTARY CAREER AWARENESS PROGRAM:
CAREER LABORATORY EQUIPMENT*

	Schools					
	Chapter II mean	s.d.	n	Non-Chapter II mean	s.d.	n
Number of different standard stations	30.29	4.75	7	23.80	4.02	10
Number of different standard stations serviceable	28.29	6.70	7	20.00	5.83	10
Number of additional stations	2.57	1.51	7	1.00	1.05	10

*Computed from data reported in survey questionnaire.

This distribution of equipment illustrates the advantage of a relatively long history of special funding for programs in the Chapter II schools, compared to

non-Chapter II schools. This observation is supported by results of a survey of the career lab instructors. Of a list of potential problems, availability of materials was most often rated most salient by both groups. But of eight possible points (on a Likert scale), the Chapter II group average was only 2.8. For the non-Chapter II group, the average was 5.3, well above the average for any other category listed.* (This list of obstacles may be found in the questionnaire, in the Appendix A).

One final point also reflects the relative disadvantage of the non-Chapter II schools. The instructors in the Chapter II schools are more experienced than those in the non-Chapter II schools, averaging 4.57 years of career lab experience, as compared to 3.55 years. This is confounded by another relevant variable. All but one of the seven Chapter II instructors are certified teachers. Only one of the 11 non-Chapter II career labs is staffed by a teacher. The rest are assistants or aides. In general, it is the teachers who have the career lab experience, with a mean of 5.3 years as compared to 3.1 years.

These differences perhaps help account for the differences in the way students are reported to use their time in the labs. Table 3 shows this information. Students in the Chapter II schools spend considerably more of their lab time on station, although the variation is large for both groups. Consequently, the average number of station assignments completed in a year is greater for the Chapter II group. Conversely, students in the non-Chapter II schools spend more of their time on activities such as films, listening to guest speakers, and field trips.

*The Director of Career Education reports that as of this year, the non-Chapter II schools are well supplied with materials, and that the survey results reflect the experiences of previous years.

TABLE 3
ELEMENTARY CAREER AWARENESS PROGRAM:
CAREER LABORATORY ACTIVITIES*

	Schools					
	Chapter II		n	Non-Chapter II		n
	mean	s.d.		mean	s.d.	
Classtime on station (minutes per week)	65.65	30.57	7	44.53	31.21	10
Stations completed in a year	^a 17.33	4.36	6	13.83	3.92	6**
Additional career experiences (guest speakers, films, field trips, etc.) (minutes of classtime per week)	14.08	7.19	7	22.58	18.19	10

*Computed from data reported in the survey.

**In four of the 10 non-Chapter II schools reporting, students are not given career awareness instruction for a full academic year.

Instructors in all the schools actively promote parent and community involvement. All maintain a guest log, recruit speakers from various occupations, and hold a yearly career day open to the community.

Two of the career lab teachers in 1982-83, in addition to their regular duties, visited the various schools, providing information and assistance. Between them, they made 75 visits, logging over 1,800 miles. Beyond this, however, there was no formal inservice available for career awareness personnel.

Description of the Project

A proposal was submitted in April, 1982 for ECIA, Chapter II funds, in support of a project for Elementary School Career Awareness. The scope of the project was seven elementary schools, six of which had previously received ESAA funding.

An amount totalling \$269,542 was requested, the bulk of which (73%) was to go for salaries and fringe benefits for seven teachers. Additional funds were requested for salary and fringes for a project secretary, and for an educational specialist whose function was to be to provide inservice, liaison, and other support functions to the schools. A small amount was included for supplies and materials.

No specific relationship was stated in the proposal between the requested funds and the operation or outcomes of the project. The reason, perhaps, is that the career labs are already in place and functioning. Teacher's salaries and a minimum of supplies and materials are essentially the total support of career awareness in these schools.

The proposal did suggest pre- and posttesting with the Fadale Career Awareness Inventory (CAI) as an evaluation of student performance. Student performance, in turn, was linked to an approach, or "plan of attack", upon which career awareness instruction in the Chapter II schools was to be based. This approach identified four factors: teachers; laboratory setting; additional career experiences; and parent-community involvement.

These four factors were selected - as the proposal states - on the basis of past experience, "because the performance of students [as measured by CAI gain scores] was outstanding". The implication (although not specifically stated) would appear to be that: 1) the four identified factors represent important variables in career awareness training; 2) they are amenable to manipulation from within the program; 3) changes in some or all of these variables are directly associated with changes in the level of student performance.

The project was funded for a total of \$198,297, providing salaries and fringe benefits for seven teachers (99%) and supplies and materials (1%).

Description of the evaluation

The initial intent was to collect data on all the 18 schools with career awareness programs, and use the 11 schools not receiving Chapter II funds in a comparison with those schools in the project. Although schools from both groups were included in the analysis, it became necessary to eliminate a number of schools. Of the Chapter II schools, two were eliminated. One, the newest to be included as a Chapter II school, was excused because of difficulties with pre-testing. The other was eliminated in the preliminary stages of analysis because errors incurred in duplicating pretest answer sheets by hand proved too great in number for the data to be reliable.

Five of the 11 non-Chapter II schools were eliminated. One was lost in mid-year when the aide teaching the career lab suffered an accident, terminating instruction for the remainder of the year. The other four were not included because students in those schools did not attend career awareness classes for the full academic year. They were consequently not comparable in performance to students in the other schools.

As a result of this attrition, the total number of schools included in the analysis was 11, five of which were Chapter II project schools. Pre- and posttest results were obtained for all these schools, on the Fadale Career Awareness Inventory (CAI), a published test which has been used in previous years. The total number of students for which matched pre-post scores were obtained for use in the analysis were 164 4th graders (from Chapter II schools only) and 378 5th graders.

Background information and qualitative insights were obtained through interviews with the Director of the project and an experienced lab teacher, and through telephone interviews, which were conducted with the teachers or aides/assistants of all the career labs. In addition, several of the career labs were visited. On the basis of this, a questionnaire was constructed (see Appendix A) and sent to the teachers and aides/assistants. Information from this questionnaire was used to construct indicators of a number of the variables used in the analysis.

The analysis was begun with an inspection of posttest gains, by school. Since no control was included in the design, t-tests were used for this purpose. Next, analyses of covariance, with the pretest as covariate, were applied to compare: 1) Chapter II schools with non-Chapter II schools; and 2) the schools which employ teachers for career lab instruction, with schools which employ assistants/aides.

Following this general analysis, a more specific investigation was undertaken, based on a linear regression model suggested by the four instructional factors put forward in the proposal. Indicators representing three of these factors were operationalized from data gathered in the survey of career labs personnel. These indicators were run as independent variables in regression analyses using as the dependent variable residuals derived from regressing the CAI posttest on the pretest. The purpose was an attempt to determine which variables, if any, might yield the greatest improvements for the least investment and effort.

Results

Group comparisons

Overall, the results of testing with the Fadale Career Awareness Inventory were impressive. For the 126 4th graders (tested only in the Chapter II schools) the mean pretest score was 68.7 and the posttest mean was 81.3, an increase of over 12 points. Similarly for the 378 5th graders from both Chapter II and non-Chapter II schools together, the posttest mean of 90.9 reflected an increase over the pretest mean of nearly nine points.

The t-test results for all five Chapter II schools (both 4th and 5th grade classes) were statistically significant beyond the $p = .01$ level. For the six non-Chapter II schools tested, the results were significant at that level for only three. The significance level for one was at $p = .034$. Two failed to achieve significance at the $p = .05$ level.

An analysis of covariance, however, with the pretest as covariate, failed to detect any significant difference between the two groups ($F = 1.32$ at 1 and 375 degrees of freedom, $p = .252$). The adjusted posttest means differed by less than two points.

The reasons for this lack of a difference are apparent upon inspection of Table 4, which displays the adjusted posttest means by school in descending order. The two schools with the highest mean scores are non-Chapter II schools, and so are the lowest three. The non-Chapter II schools are widely disparate in mean student performance. In contrast, the means for the Chapter II schools cluster more closely together from mid-range upward. The difference between the two groups is not a mean difference, but one of consistency of schools within the group in producing increases in student performance.

Table 4
ELEMENTARY CAREER LAB SCHOOLS:
ADJUSTED CAI POSTTEST MEANS

School	Adjusted Mean Scores	N
One	95.40	94
Two	94.98	37
Three*	94.05	27
Four*	92.99	22
Five*	92.26	19
Six	89.32	11
Seven*	88.38	27
Eight*	88.27	29
Nine	85.60	39
Ten	82.46	17
Eleven	81.88	56

Results of analysis of covariance by school, with CAI pretest as covariate:

$F = 7.69$ $df = 10, 367$ $p = .0058$

*Asterisk denotes a Chapter II school.

An alternative grouping of the schools produces a slightly different result. All except one of the Chapter II schools are staffed with certified teachers. None of the non-Chapter II schools tested are. When an ANCOVA is performed on these two groupings - teacher v. non-teacher - the resulting effect is to triple the value of the F ratio ($F = 3.20$ at 1 and 375 degrees of freedom, $p = .074$). Although still not significant at the $p = .05$ level, this effect may be interpreted as an indication that the question of personnel is among those worthy of further investigation.

Regression Analyses

Using data collected in the course of the evaluation, eight variables were created, representing three of the four factors specified in the proposal as important in contributing to improvements in student career awareness. These three were: 1) teachers (i.e., instructor personnel); 2) laboratory setting; 3) additional career experiences. The data available were not adequate for the quantification of the fourth factor, parent-community relations. All of these

variables are "school variables". Each student from the same school receives the same "score" on each. Detailed descriptions of the construction of all variables are given in Appendix F.

These variables were treated as the independent variables, and their relationship to the dependent variable, student performance, was conceived to be linear and additive (i.e., the models were linear regression equations). The dependent variable (called CAIR) was operationalized as the residuals of the regression of the posttest on the pretest scores of the Fadale Career Awareness Inventory. The subjects were the 378 5th grade students from the 11 included schools, for which pre- and posttest CAI scores were available.

The following discussion outlines the development of the analysis and points out the more interesting results. The correlation matrix and complete commonality tables are given in the appendices.

Career lab personnel variables. Four variables reflecting aspects of personnel influences on student achievement were constructed. Two are straightforward measures. One, called "teacher presence" (TP), was a dummy variable reflecting the presence or absence of a certified teacher in the classroom. The other, labeled "years career lab" or YRS, was simply the number of years the teacher or assistant/aide had been a career lab instructor.

The remaining two, called "goal agreement" (GA) and "teacher-referenced career station preference" (CSP), are measures of the effect of the certified teachers' collective opinions on each other, and on the assistants/aides. GA is an indirect measure of the degree of orientation to a composite teacher ranking of selected career awareness goals. The CSP variable is a measure of the degree to which the subject agrees with the composite teacher ranking of the relative desirability of the career work stations (and by implication, the careers). Both are, by design, positively correlated with TP, and were constructed to represent "teacher orientation" qualities in all personnel. The dependent variable, CAIR, was regressed on these four variables and a commonality analysis performed. The four together accounted for a modest 11% of the variance. Table 5 gives the unique contributions of each variable, and the variances held in common. One result that stands out, is that YRS dominates the equation, and TP makes only a small unique contribution. It does not follow, however, that experience is everything, and that teachers are not very important to career education.

Table 5

ABRIDGED* SUMMARY OF COMMONALITY ANALYSIS:
REGRESSION OF C.A.I. RESIDUALS ON
CAREER LAB PERSONNEL VARIABLES

	1	Variables 2	3	4
	Teacher Presence	Years in Career Lab	Goal Agreement	CSP
r^2 with CAIR	.0087788	.0646398	.0411992	.0121988
Unique to 1	.0133136			
2		.0668458		
3			.0043871	
4				.0351844
Common to 1,2	-.0125618	-.0125618		
1,4	-.0127208			-.0127208
2,3		.0252447	.0252447	
2,4		-.0340836		-.0340836
Common to 1,2,4	.0139467	.0139467		.0139467

*Only commonalities greater than |.0130| are included.

First, the effect of YRS is to suppress the TP effect. When YRS (and CSP, discussed below) is controlled, the contribution of TP increases somewhat, above its simple correlation with CAIR. This reflects the fact that some assistants/aides are also both experienced, and successful in increasing student performance.

Second, the GA variable is influential almost exclusively through its relationship with YRS. In term of its simple (r^2) relationship with CAIR, GA is the second most important of the four variables (after YRS), yet its unique contribution in the equation is nil. And aside from the (relatively) large variance held in common with YRS, it shares very little variance with any other variable. The implication is that one important factor in the experience gained from years in the career labs, is that of a learned agreement with a teacher-defined ranking of the goals of career education.

The CSP variable exhibits a more complex relationship with student performance. Its unique contribution in the equation is triple that of its simple (r^2) relationship with CAIR, indicating that its effect is being suppressed by one or more of the other variables. In fact, the two suppressor variables are YRS and TP, when each is controlled separately. Yet when both are controlled together

in the presence of CSP, the three jointly share a contribution to explaining the variance in CAIR. This would appear to be due to the fact that the YRS effect is also suppressed by the presence of TP. Presumably, CSP shares with YRS that variance that remains when the TP influence is removed from YRS.

Now, both CSP and GA were constructed to reflect different aspects of the collective attitudes of the teachers in the program. However, they share almost no variance in common. They represent two more or less unrelated aspects of teacher orientation in the career lab personnel. Both CSP and GA are correlated with YRS ($r = .80$ and $r = .43$ respectively) and both are strongly related to it in contributing to the variance of CAIR accounted for. The conclusion is that CSP is a second (along with GA) important consequence of career lab experience.

The effect of CSP on CAIR, however, is opposed to that of GA. Where GA varies directly with CAIR (the higher the goal agreement of the instructor, the higher the performance of his/her students tends to be), CSP varies inversely. (The modest positive simple correlation of CSP with CAIR appears due to the very high simple correlation of CSP with YRS. When both are entered in the same equation, the relationship of CSP to CAIR is negative).

The implication of all this for the career awareness program is as follows: The presence of a teacher in the career lab is not crucial. An orientation toward the goals of career education that is in agreement with a ranking established with teachers' attitudes, however, is important. This orientation has influence on student performance, not independently, but through years in career lab, implying that it is learned through supervision by and/or association with (other) teachers.

The relative emphasis that the instructor places on the different work stations is also important for student performance. With years in career lab, this emphasis tends increasingly to agree with the collective choices made by the teachers in the program. This tendency, however, runs counter to the tendency for student productivity to increase. More succinctly, insofar as experience leads to conformity with what teachers tend to prefer concerning work stations, it is likely to reduce effectiveness in teaching career awareness. The most reasonable interpretation of this is not that teachers as a group make poor choices concerning work stations, but rather that there is considerable diversity in the needs of student populations, and that the effective instructor gives precedence to this need.

Variables relevant to the laboratory setting. An additional four variables were constructed to study the effects of career lab activities on student performance. All deal with aspects of the work stations. Variety of Stations (V) is simply the count of the different stations, present in the lab and serviceable. Classtime-on-station (TS) is the instructor's reported time per week, in minutes, that students spend on station. Stations Completed (SC) is the number of stations, on the average, that a student will complete in an academic year, as reported by the instructor. Finally, Time-on-each-station (EA) is a composite of TS and SC, measuring the average amount of time spent on each station in the course of the year's instruction.

Like the personnel variables, these four variables together account for only a modest amount of the variance in CAIR (9%). The relevant information is given in Table 6. The variety of stations, V, contributes little to the equation. The number of different stations available is apparently not an important factor in student performance. Time spent on station is of slight importance, a part of its variance being shared with SC. The unique variance contributed by EA is relatively large, and indicative of the presence of suppressor variables. Not surprisingly, these suppressors are TS and SC, the variables from which EA was constructed.

Table 6

ABRIDGED* SUMMARY OF COMMONALITY ANALYSIS:
REGRESSION OF CAI RESIDUALS ON LABORATORY SETTING VARIABLES

		5 Variety of Stations	6 Time on Station	Variables 7 Stations Completed	8 Time on Each Station
r^2 with CAIR		.0000619	.0179558	.0322842	.0017008
Unique to	5	.0085122			
	6		.0187991		
	7			.0558978	
	8				.0313147
Common to	6,7		.0152017	.0152017	
	7,8			-.0141137	-.0141137
Common to	6,7,8		-.0204843	-.0204843	-.0204843

*Only commonalities greater than .01301 are included.

The major variable in this group is SC, stations completed, with a unique contribution to the equation of 5.6% of variance. It would seem that this is the most important factor of the laboratory setting.

A limited model of career awareness instruction. A full or complete model of elementary career awareness instruction, as it is conceived here, would incorporate variables representing all four of the factors mentioned in the proposal as responsible for increasing student performance. As mentioned earlier, it was not possible at this time to construct a variable representing the fourth (parent-community involvement). Thus the model presented here is limited to incorporating measures of the first three factors: teachers (i.e. career lab personnel); laboratory setting; and additional career experiences.

The first and second factors are represented by some - but not all - of the variables previously presented. For the first factor, YRS, GA, and CSP are used; for the second factor, SC and EA. The third factor is represented by one variable. This variable, additional experiences, or AE, is the classtime in minutes spent on activities such as films, interviews, field trips and research studies.

When CAIR is regressed on these 6 variables, the variance accounted for, while not large ($R^2 = .146$), is statistically significant well beyond the .001 level.

Table 7 displays the main information from the commonality analysis. Commonalities of the third order and higher (four or more variables sharing variance in common) are not interpreted here. Lacking any specific and accepted theory with which to relate the variables causally, these higher order commonalities are regarded as indications of the lack of specificity of the variables employed. The larger of these are included in the table to indicate the extent of this problem.

TABLE 7
ABRIDGED* SUMMARY OF COMMONALITY ANALYSIS:
LIMITED CAREER AWARENESS INSTRUCTION MODEL

	2 Yrs Career Lab	3 Goal Agmt	Variables 4 CSP	7 Stat. Compl.	8 Each Time Sta.	9 Add'l Exper.
r^2 with CAI	.0646398	.0411592	.0121988	.0322842	.0017008	.0824066
Unique to 2	.0049754					
3		.0222126				
4			.0234498			
7				.0201616		
8					.0005706	
9						.0085006
Common to 2,3	.0159137	.0159137				
3,4		-.0173356	-.0173356			
3,7		-.0157744		-.0157744		
4,7			-.0138472	-.0138472		
7,9				.0195902		.0195902
Common to 2,7,9	.0337517			.0337517		.0337517
3,4,9		-.0167120	-.0167120			.0167120
Common to 2,3,8,9	.0148903	.0148903			.0148903	.0148903
3,4,7,9		.0186985	.0186985	.0186985		.0186985
3,4,8,9		.0133689	.0133689		.0133689	.0133689
Common to 2,3,4,8,9	-.0208706	-.0208706	-.0208706		-.0208706	-.0108706
3,4,7,8,9		-.0158119	-.0158119	-.0158119	-.0158119	-.0158119

*Only commonalities greater than .0130 are included.

Looking first at the variable YRS, it will be noted that its unique contribution drops considerably when it is entered into the larger equation. Much of its variance is contributed through GA, SC, and AE. The rest is diffused among four or more variables. The suppressor effect on CSP has disappeared. This is not surprising. Like any "time variable", years in Career Lab is not itself a causal variable, but a "holding variable", representing the time during which other variables are active. To the extent that these other variables can be identified and effectively measured, the holding variable's direct effect should be correspondingly reduced.

Three of these "other variables" now dominate the equation. The unique contributions of the variables GA, CSP, and SC are each significant beyond the .01 level (none of the unique contributions of the remaining variables achieve significance at the .05 level). The conclusion from this is that, within the scope of the analysis, student performance tends to increase as: 1) the instructor's perception of the relative importance of career education goals approaches agreement with that of the teachers as a group; 2) the instructor's independent judgment of the relative importance of work stations in her lab increases*; 3) the average number of stations completed by students in a year increases.

Of the two remaining variables, whatever effect EA makes is too diffuse to be intelligible. The AE variable is more interesting. Although its unique contribution is small, its simple correlations with YRS and SC are fairly strong, and all negative. It is precisely through these variables that AE contributes variance in the multiple regression. In terms of classtime, additional career experiences compete with stations completed, and the less experienced instructors tend to make the most use of it. This explains the moderate and negative simple correlation with CAIR. GA and CSP act as suppressor variables.

The AE variable does not measure additional career experiences directly, but rather the amount of classtime reportedly set aside for them. Because of this, the effects described above likely reflect more about how effectively this time is used than about the effect of such experiences on student performance.

Implications

To sum up, $R = .382$ for the limited career awareness model, yielding an explained variance of nearly 15 percent. The unique contributions of three of the variables (Goal Agreement, Career Station Preferences, Stations Completed) are each significant well beyond $p = .01$. A fourth variable, Additional Career Experiences, has a unique contribution significant at .055. (A summary of the results of the limited model are given in Appendix K.)

*Since CSP is negatively related to CAIR, it decreases as student performance increases. However, the CSP score is itself a measure of the instructor's agreement with the index of teacher choices (of career work stations), and a low CSP score may be interpreted as an indication of an "independent judgment" (independent of the teachers' choice index). It is this that is said to vary directly with student performance.

To understand what this means in terms of practical significance, recall that when the CAI pretest was controlled, a significant difference ($p = .006$) was found among the adjusted posttest means for the schools (see Table 4). This difference is the result of various effects which occurred during the school year under analysis, presumably in the career labs.

Among those "various effects" are those represented by the four variables mentioned above. Since controlling the pretest screens out effects prior to the school year, then if these four are also controlled the resulting school posttest means should reflect only those inter-school effects not accounted for by the regression model. That is, a second ANCOVA controlling for the five variables should show whatever differences among the schools remain after the effects of the variables identified as important for career awareness are removed.

Comparing the results:

- a. ANCOVA 1 (CAI pretest as covariate), $F = 7.69$, $p = .006$;
- b. ANCOVA 2 (five covariates), $F = 1.64$, $p = .094$.

When the pretest alone is controlled, there are significant differences among the schools. When the four regression variables are added, the significant differences disappear. These four variables are by themselves sufficient to account for the differences that occur among the schools as a result of events that take place within the school year. (A complete summary of ANCOVA 2, including all unadjusted and adjusted posttest means, is given in Appendix L.)

Discussion and Recommendations

The primary question to be addressed by this evaluation is, did Chapter II funds make any difference? The answer is yes. There is a difference in student performance in career awareness programs - as measured by the Fadale Career Awareness Inventory - between schools receiving Chapter II funding, and those which do not, when the schools are considered as distinct groups. While student performance in some non-Chapter II schools is outstanding, performance in others has shown no improvement at all. In comparison, student performance in all the Chapter II schools tested was significantly improved in every case. It is this consistency of quality performance that sets the Chapter II group apart.

Presumably this difference reflects the consequences of stable and adequate funding over a number of years. On the basis of this observation of performance, the following recommendation is made.

It is recommended that the elementary career awareness project be refunded for another year.

[1]

A second question follows: What can reasonably be done within the scope of the Program's resources, to help all participating schools become more uniformly successful in producing a high student performance in career awareness? This question requires some discussion. The reasons for the difference noted above are not immediately apparent. It was noted earlier that the two groups do not

differ in mean student performance. The two most obvious group differences (staffing by teachers in the Chapter II schools, and differences in how the labs are equipped) were found not to be of help in accounting for student performance.

Four variables were identified in the analysis as contributing to the explanation of student performance: Stations Completed, Goal Agreement, Career Stations Preference, and (less directly), Additional Career Experiences. That the two groups differ on these variables is shown in Table 8.

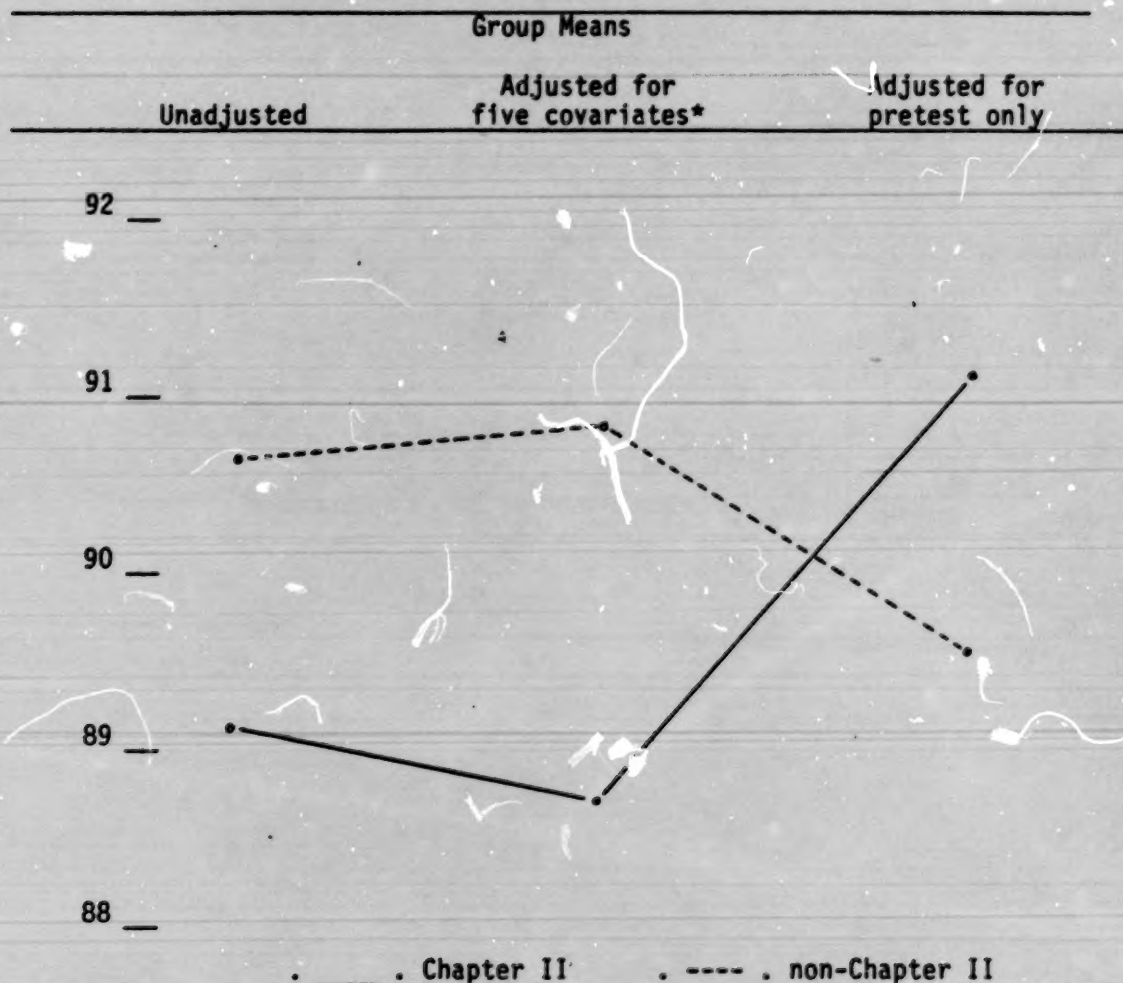
TABLE 8
COMPARISON OF CHAPTER II AND NON-CHAPTER II GROUPS
OF SCHOOLS ON VARIABLES IDENTIFIED IN THE REGRESSION ANALYSIS

	Mean Group Scores	
	Chapter II	non-Chapter II
Goal Agreement	.660	.369
Career Station Preference	.869	.809
Stations Completed	16.709	15.886
Additional Career Experiences	12.460	16.890

It was shown in the preceding section that these four variables are by themselves sufficient to account for the differences in student performance that remain among the schools after the pretest effects are controlled. This is shown again, for the two groups, in Figure 1. In that figure, the lines between the unadjusted means and the means adjusted for all five variables (including the CAI pretest) are very nearly horizontal. There are virtually no observable differences between the two means for either group. The differences appear when only the pretest is controlled, with the expected results. (These results are muted when the schools are grouped, due to the aforementioned uneven performances of the non-Chapter II schools; see Appendix L for the listing of adjusted means by school.) The mean posttest score for the Chapter II schools is adjusted upward, that for the non-Chapter I schools downward, demonstrating graphically the collective effect of the group differences in the variables shown in Table 8.

Figure 1

EFFECTS OF CONTROLLING SELECTED VARIABLES ON THE CAI
POSTTEST MEANS OF CHAPTER II AND NON-CHAPTER II SCHOOLS



*The five statistically controlled variables are: the CAI pretest; Goal Agreement; Career Station Preference; Stations Completed; and Additional Career Experiences.

Consider first the directly measured variables. Stations Completed is directly associated with student performance. The more stations completed, the higher the CAI score tends to be. As a group, the Chapter II schools average nearly four more stations per year per student than do the non-Chapter II schools.

It is recommended that the number of work stations completed per student be increased where feasible.

[2]

Additional Career Experiences is negatively related to student performance. The more classtime allotted to such experience, the lower student performance tends to be. Again the two groups differ in the expected way. This time it is the non-Chapter II groups that spend more classtime on Additional Career Experiences, nearly ten minutes more per week than the schools of the Chapter II group. The standard deviation is also large, indicating that some non-Chapter II schools spend a great deal of classtime on Additional Career Experiences. From these observations a third recommendation follows.

It is recommended that the activities considered as "additional career experiences" be monitored to ensure that the time given over to them is utilized effectively.

[3]

The two remaining variables were designed to make some of the qualities associated with certified career lab teachers into non-dichotomous measures, permitting those qualities to be observed in career lab instructors who were not teachers. Goal Agreement is positively correlated with student achievement, the two increasing together. Not surprisingly, given the variable's construction, the Chapter II group has the highest mean score. The Goal Agreement variable is one way of measuring the difference in the two groups in terms of career lab staffing (recall however, that one Chapter II school was staffed by an assistant, and one non-Chapter II school has a teacher).

Career Station Preference is inversely related to student performance, decreasing as the latter increases. Once again the Chapter II group is higher, since the variable is referenced on the collective preference of teachers. In this instance the non-Chapter II schools have an advantage with the lower mean score. Both groups, however, average relatively high on this measure, with low standard deviations. The measure seems to reflect a nondesirable influence of the teachers on non-teachers.

One final fact brings these differences between Chapter II and non-Chapter II groups into coherent perspective. Taken across all 5th graders included, in all the schools ($N = 378$), each of these four variables is moderately to strongly correlated with Years of Career Lab Experience. Both Goal Agreement ($r = .43$) and Stations Completed ($r = .65$) increase with years in career lab, whereas time spent on additional career experiences tends to decrease ($r = -.57$). There is a strong positive relationship between career stations preferred and years in career lab ($r = .80$), reflecting an unwanted consequence of length of service. The indication is that, to a great extent, strong scores in the "right" direction on these variables are a product of years of association with the career awareness program. Years of career lab experience no doubt reflect both increases in learned competence in career awareness instruction, and also a convergence of attitudes and perspective. This was in fact demonstrated in the commonality analysis, where each variable, at some point, shared relatively large amounts of variance with the YRS variable.

More years of experience in the career lab, then, is one answer to the second question raised above. It is not however, a very practical one. It seems likely though, that once the skills and attitudes acquired through that experience are identified, formal training would be one quick way to substitute for time in helping to raise all the schools to the same level of performance. It would also be a more efficient way, since one unwanted effect of undirected experience (the convergence of preferences for the same set of career stations) could be deliberately avoided. A second recommendation follows from this reasoning.

It is recommended that requests for support related to the provision of inservice programs for career awareness personnel (such as the request for an educational specialist in the present proposal) be granted funds.

[4]

APPENDICES

APPENDICES

- A. Teacher Information Survey Questionnaire
- B. Results of T-Tests
- C. Analysis of Covariance Summary: Comparison of Chapter II and non-Chapter II Groups on CAI Posttest
- D. Analysis of Covariance Summary: Comparison of Schools on CAI Posttest Scores
- E. Analysis of Covariance Summary: Comparison of Teacher and Assistant/Aide Groups on CAI Posttest
- F. Descriptions of the Variables for the Regression Analysis
- G. Correlation Matrix
- H. Complete Summary of Commonality Analysis: Regression of Career Awareness Inventory Residuals on Career Lab Personnel Variables
- I. Complete Summary of Commonality Analysis: Regression of Career Awareness Inventory Residuals on Laboratory Setting Variables
- J. Complete Summary of Commonality Analysis: Career Awareness Instruction Model
- K. Summary Data on Regression Model of Career Awareness Instruction
- L. Analysis of Covariance Summary: Comparison of Schools on CAI Posttest Scores with Five Covariates

Appendix A

DADE COUNTY PUBLIC SCHOOLS

ELEMENTARY CAREER LAB

TEACHER INFORMATION SURVEY

Name _____ School _____

Position: (check one) _____ Teacher
 _____ Teacher Assistant
 _____ Teacher Aide

Years of Teaching experience (Dade County or elsewhere): _____

Years of Career Lab teaching experience (include this year as one): _____

In the columns below, please list separately every career lab class that you are now teaching.

	Grade	Number of Students	Class Period (minutes)	Days Met (M T W TH F)
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
13.				
14.				
15.				
16.				
17.				
18.				
19.				
20.				

Do you keep the same students all year (September through June)? Yes _ No _

If No, then: (a) How many groups do you teach during the school year? _____

(b) For how many weeks do you teach each group? _____

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Following is a list of the original set of career awareness lab activities:

- A. In the first column to the right of the list (labeled A), please check (x) those stations which you have in your lab, whether or not they are in a condition to be used by students.
- B. In the second column (labeled B), identify (x) those stations in your lab which are serviceable (i.e., in a condition to be used by students).
- C. In the third column (labeled C), please indicate (x) the ten stations you would choose if you had to furnish a career lab with just ten activities to be chosen from this list. (No write-ins, please.)

LIST OF CAREER LAB ACTIVITIES

Activity	A: present in your lab?	B: equipment serviceable?	C: check choice.
1. Adding Machine Operator	_____	_____	_____
2. Bricklayer	_____	_____	_____
3. Calculator Operator	_____	_____	_____
4. Cashier	_____	_____	_____
5. Cement Finisher	_____	_____	_____
6. Civil Engineer	_____	_____	_____
7. Commercial Advertising Artist	_____	_____	_____
8. Cosmetology (manicure)	_____	_____	_____
9. Cosmetology (wig styling)	_____	_____	_____
10. Dental Hygienist	_____	_____	_____
11. Dental Technician	_____	_____	_____
12. Doctor	_____	_____	_____
13. Draftsman	_____	_____	_____
14. Electrician	_____	_____	_____
15. Electronic Assembler	_____	_____	_____
16. File Clerk	_____	_____	_____
17. Fingerprint Technician	_____	_____	_____
18. Garment Worker	_____	_____	_____
19. Mechanical (adjusting carburetor)	_____	_____	_____
20. Mechanical (adjusting spark plugs)	_____	_____	_____
21. Mechanical (cleaning air filter)	_____	_____	_____
22. Mechanical Engineer	_____	_____	_____
23. Nurse (Patient's weight)	_____	_____	_____
24. Nurse (Using thermometer)	_____	_____	_____
25. Photographic Technician	_____	_____	_____
26. Printer (Silk Screen)	_____	_____	_____
27. Printer (Sign Painting)	_____	_____	_____
28. Receptionist	_____	_____	_____
29. Secretary	_____	_____	_____
30. Sheet Metal Worker	_____	_____	_____
31. Tile Setter	_____	_____	_____
32. Typist	_____	_____	_____
33. Waiter/Waitress	_____	_____	_____

CAREER LAB SURVEY (continued)

3.

In reference to the list of career lab activities, or stations:

A. Do you have stations in your lab that are not on the list? If so, what are they?

B. Is (are) there any station(s) that you do not have in your lab, and which are not on the list, that you think would make an important addition to your students' experience? Please specify.

C. On the average, how many stations will a student complete in a year (September through June)? _____

Proportioning Class Time

At present, what proportion of your class time is spent (in percent):

Given a choice, how would you proportion your class time?

1. with students on station	_____ %	_____ %
2. lecturing and instructing	_____ %	_____ %
3. utilizing visitors, films, field trips, etc.	_____ %	_____ %
4. other ways (specify)	_____ %	_____ %

Total: 100 %

100 %

CAREER LAB SURVEY (continued)

4.

Below is a list of situations or conditions that might create problems for you in meeting your objectives as a career lab teacher. To the right of each situation listed is a broken line representing a continuum from "does not create a problem" to "creates a problem". For each situation, place a mark at that point on the line which best reflects your judgement of how great a problem that situation creates. If the situation is not relevant to your lab, place a mark on the "non-applicable" (N/A) column.

	Does not create a problem	Creates a great problem	N/A
Students academically unprepared for material	_____	_____	_____
Presence of exceptional students	_____	_____	_____
Presence of English-as-Second-Language Students	_____	_____	_____
Students indifferent to subject matter	_____	_____	_____
Too many students to be served	_____	_____	_____
Classes too large	_____	_____	_____
Not enough lab or instruction time	_____	_____	_____
Availability of equipment and materials	_____	_____	_____
Clarity of program objectives	_____	_____	_____
Gaining acceptance of career lab by parents	_____	_____	_____
Gaining acceptance of career lab by community	_____	_____	_____
Gaining acceptance of career lab by faculty	_____	_____	_____
Gaining acceptance of career lab by administrators	_____	_____	_____

Given the goals of the Elementary Career Lab Program, evaluate the relative importance of each of the following objectives to the program by assigning a rank order from one (most important) to seven (least important).

RANK OBJECTIVE

- _____ Identify the job title (and related job titles) of a number of workers.
- _____ Demonstrate awareness of the educational requirements of jobs.
- _____ Personally know workers in a variety of occupations.
- _____ Distinguish between "product" occupations and "service" occupations.
- _____ Be aware of the relative prestige or status of various occupations.
- _____ Identify jobs as belonging or not belonging to certain job clusters.
- _____ Associate specific preferences or abilities with certain occupations.

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CARE/LAB/SUR.0, 1, 2, 3

Auth: M/S; Exp. Date: Feb. 23, 1983

Appendix B
RESULTS OF T-TESTS

	Pretest Mean	Posttest Mean	df	t	p
Chapter II Schools, 4th Grade					
	76.26	90.41	33	7.82	.000
	63.30	80.90	19	5.83	.000
	61.11	74.74	34	6.29	.000
	71.63	79.24	37	3.48	.001
Chapter II Schools, 5th Grade					
	72.19	87.41	26	8.15	.000
	68.79	79.30	26	3.77	.001
	79.00	90.37	18	3.93	.001
	96.18	103.09	21	3.36	.003
	82.17	88.59	28	3.01	.005
Non-Chapter II Schools, 5th Grade					
	87.71	99.59	93	10.69	.000
	87.81	99.24	36	5.73	.000
	68.92	76.67	38	3.29	.002
	85.55	92.00	10	2.25	.029
	72.71	76.18	16	1.43	.173
	84.32	83.70	55	.37	.712

Appendix C

ANALYSIS OF COVARIANCE SUMMARY: COMPARISON OF CHAPTER II AND NON-CHAPTER II GROUPS ON CAI POSTTEST

K = 2 groups
N = 378 fifth grade students
Covariate: pretest

Source	df	SS _x	SP	SS _y	df'	SS' _y	MS' _y
Between	1	1287.925	479.873	178.801	1	197.336	197.336
Within	376	103091.480	79016.392	116670.045	375	56106.454	149.617
Total	377	104379.405	79496.270	116848.847	376	56303.791	XXX

F = 1.318

df = 1, 375

p = .251

b_w = .766

Group	x mean	y mean	adjusted y	N
Chapter II schools (5)	79.06	89.06	91.09	124
non-Chapter II schools (6)	83.00	90.62	89.63	254

Appendix D
ANALYSIS OF COVARIANCE SUMMARY:
COMPARISON OF SCHOOLS ON
CAI POSTTEST SCORES

K = 11 schools
N = 378 fifth grade students
Covariate: pretest

Source	df	SS _x	SP	SS _y	SS'	df	MS' _y
Between	10	24844.130	13978.384	31346.818	9824.827	10	983.483
Within	367	79535.275	55517.886	85502.028	46748.965	366	127.729
Total	377	104379.405	79496.268	116848.847	56303.791	376	XXX

F = 7.692

df = 10, 367

p = .006

$b_w = .698$

School	x mean	y mean	adjusted y	N
1	87.71	99.59	95.40	94
2	87.81	99.24	94.98	37
3*	72.19	87.41	94.05	27
4*	96.18	103.09	92.99	22
5*	79.00	90.37	92.26	19
6	85.55	92.00	89.32	11
7*	82.17	88.59	88.27	29
8*	68.70	79.30	88.38	27
9	68.92	76.67	85.60	39
10	72.71	76.18	82.46	17
11	84.32	83.70	81.88	56

*indicates a Chapter II school

Appendix E

ANALYSIS OF COVARIANCE SUMMARY: COMPARISON OF TEACHER AND ASSISTANT/AIDE GROUPS ON CAI POSTTEST

K = 2 groups
N = 378 fifth grade students
Covariate: pretest

Source	df	SS _x	SP	SS _y	df'	SS'y	MS' _y
Between	1	1635.887	369.612	83.510	1	476.877	476.877
Within	376	102743.518	79126.658	116765.337	375	55826.913	148.872
Total	377	104379.405	79496.270	116848.847	376	56303.790	XXX

F = 3.203

df = 1, 375

p = .074

b_w = .770

Group	x mean	y mean	adjusted y	N
Schools w/ teachers, (4)	78.12	89.33	92.09	95
Schools w/ aides/assts. (7)	82.91	90.41	89.48	283

Appendix F

DESCRIPTIONS OF THE VARIABLES FOR THE REGRESSION ANALYSIS

- Y. CAIR, Career Awareness Inventory Pre-post Residuals. This variable consists of the residuals ($Y - \hat{Y}$) from the equation $\hat{Y} = 27.90 + .76X$, where X represents the CAI pretest. The N (378 5th graders) is the same for all variables.
1. TP, Teacher Presence, is a dummy variable, with 1 representing a school with a certified teacher as career lab instructor, and a 0 otherwise.
 2. YRS, Years in Career Lab, is the number of years of career lab experience an instructor reported in the survey conducted in February, 1983, with the current year included.
 3. GA, Goal Agreement. The teacher information survey questionnaire contained a list of seven objectives or goals (p.4) which each instructor was asked to rank in order of importance. When the teachers' rankings were analyzed as a group ($n = 7$), Kendall's Coefficient of Concordance was highly significant ($W = .499, p = .002$). Following Siegal (Nonparametric Statistics, 1957), this result was "interpreted as meaning that the observers or judges are applying essentially the same standard in ranking..." (p.237). The same test applied to the rankings of the assistants and aides ($n = 10$) was not significant ($W = .169, p = .118$). The pooled ordering of the teachers was then taken as a "standard," and a correlation coefficient (Spearman's rho) computed with each instructor's individual ranking, teachers as well as assistants and aides. These coefficients constitute the scores of the Goal Agreement variable. Since the teachers' rankings were included in the standard ranking, the measure is weighted toward them, yielding a nondichotomous measure of one characteristic of the teachers in the program.
 4. CSP, Career Stations Preference. In the survey questionnaire, respondents were asked to choose, from among the 33 standard work stations, 10 that they would prefer if they had to build a new lab of only 10 stations. The choices of the teachers were then pooled and a rank ordering made of the standard stations, with the most often chosen station given the highest rank and rank number (33). This ordering was then regarded as the teacher's collective ranking of the work stations from most to least important. The rank numbers of the 10 choices of each respondent were then summed, and "normalized" with linear transformations into a score ranging from 0 to 1, where 0 represents complete lack of agreement with the ranking, and 1 complete agreement. Again the construction is such that the weighting is in favor of the teachers, giving another nondichotomous measure of an aspect of "teacherness".

5. V, Variety of Stations, is the total number of work stations in the career lab reported present and serviceable. The total includes the 33 standard stations and any additional stations reported.
6. TS, Time on Station, is the average minutes per week spent by students at work stations, computed as the product of total weekly classtime in minutes and the percent/100 of time reported on station in the survey questionnaire.
7. SC, Stations Completed, is the average number of stations that students complete in a year, as reported by instructors.
8. EA, Time on Each Station, is made up as the product of time on station in minutes per week times 36 weeks, divided by the average number of stations completed in a year.
9. AE, Additional Career Experiences, is the time in minutes per week spent on activities such as films, guest speakers, and field trips, computed as the product of total weekly classtime in minutes and percent/100 of time reported for this activity in the survey questionnaire.

Appendix G

CORRELATION MATRIX

	Teacher Presence	Years Career Lab	Goal Agreement	C.S.P.	Variety of Stations	Classime on Station	Stations Completed	Time on Each Station	Additional Career Exper.	C.A.I. Residuals
Teacher Presence	1.0000									
Years Career Lab.	.2034	1.0000								
Goal Agreement	.2494	.4311	1.0000							
C.S.P.	.4479	.7997	.3189	1.0000						
Variety of Stations	.5628	.6107	.3696	.8137	1.0000					
Classime on Station	.4942	-.1712	.2740	-.3650	-.1676	1.0000				
Stations Completed	.3749	.6468	-.1662	.6829	.3805	-.1469	1.0000			
Time on Each Station	.1445	-.3877	.3706	-.6129	-.2762	.8451	-.6204	1.0000		
Add'l Career Exper.	-.2050	-.5667	-.1653	-.3937	-.1925	-.0545	-.5671	.1771	1.0000	
CAI Residuals	.0937	.2542	.2030	.1104	.0079	.1348	.1797	.0412	-.2871	1.0000

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Appendix H

COMPLETE SUMMARY OF COMMONALITY ANALYSIS REGRESSION OF CAREER AWARENESS INVENTORY RESIDUALS ON CAREER LAB PERSONNEL VARIABLES

	1	2	3	4
	Teacher Presence	Years in Career Lab	Goal Agreement	C.S.P.
Unique to 1	.0133135715			
2		.0668457991		
3			.0043870622	
4				.0351844422
Common to 1,2	-.0125618419	-.0125618419		
1,3	.0048677495		.0048677495	
1,4	-.0127208268			-.0127208268
2,3		.0252446801	.0252446801	
2,4		-.0340835847		-.0340835847
3,4			.00570341	.00570341
Common to 1,2,3	-.0031723997	-.0031723997	-.0031723997	
1,2,4	.0139466899	.0139466899		.0139466899
1,3,4	-.0036217731		-.0036217731	-.0036217731
2,3,4		-.0003072321	-.0003072321	-.0003072321
Common to 1,2,3,4	.0087277159	.0087277159	.0087277159	.0087277159
(r^2 with CAIR)	.0087788853	.0646398266	.0411992128	.0121988413

$$R^2_{y.1234} = .1111234621$$

Appendix

COMPLETE SUMMARY OF COMMONALITY ANALYSIS REGRESSION OF CAREER AWARENESS INVENTORY RESIDUALS ON CAREER LAB SETTING VARIABLES

	5 Variety of Station	6 Time-on-Station	7 Stations Completed	8 Time-each-Station
Unique to 5	.0085122446			
6		.0187991467		
7			.0558978473	
8				.0313146536
Common to 5,6	-.005516941	-.005516941		
5,7	-.0084983033		-.0084983033	
5,8	-.0064002937			-.0064002937
6,7		.015201681	.01520681	
6,8		.005323785		.005323785
7,8			-.0141136921	-.0141136921
Common to 5,6,7	.0059046236	.0059046236	.0059046736	
5,6,8	.0076842827	.0076842827		.0076842827
5,7,8	.0073328402		.0073328402	.0073328402
6,7,8		-.0204843019	-.0204843019	-.0204843019
Common to 5,6,7,8	-.0089565041	-.0089565041	-.0089565041	-.0089565041
(r ² with CAIR)	.000061949	.017955772	.0322841907	.0017007697

$$R^2_{y-5678} = .0920010686$$

Appendix J

COMPLETE SUMMARY OF COMMONALITY ANALYSIS
CAREER AWARENESS INSTRUCTION MODEL

		2 Years in Career Lab	3 Goal Agreement	4 C.S.P.	7 Stations Completed	8 Time-each-Station	9 Additions Career Expe
Unique to	1	.0049754177					
	2		.022212626				
	3			.025497811			
	4				.0201616122		
	5					.0005755759	
	6						.008500575
Common to	1,2	.0159137034	.0159137034				
	1,3	-.0038516321		-.0038516321			
	1,4	.011203697			.011203697		
	1,5	.0004748559				.0004748559	
	1,6	.0044843024					.0044843024
	2,3		-.0173356178	-.0173356178			
	2,4		-.0157744411		-.0157744411		
	2,5		.0100462076			.0100462976	
	2,6		.0044438755				.0044438755
	3,4			-.0138472014	-.0138472014		
	3,5			.0093094421		.0093094421	
	3,6			.0078502723			.0078502723
	4,5				-.0005434152	-.0005434152	
	4,6				.0195901678		.0195901678
	5,6					-.0001692079	-.0001692079
Common to	1,2,3	-.0013098534	-.0013098534	-.0013098534			
	1,2,4	-.0080774626	-.0080774626		-.0080774626		
	1,2,5	.0088445472	.0088445472				
	1,2,6	.0129601935	.0129601935			.0088445472	
	1,3,4	-.004120195		-.004120195	-.004120195		.0129601935
	1,3,5	-.0015799103		-.0015799103		-.0015799103	
	1,3,6	-.0017347681		-.0017347681			-.0017347681
	1,4,5	-.0002773092			-.0002773092	-.0002773092	
	1,4,6	.0337516615			.0337516615		.0337516615
	1,5,6	8.423726E-05				8.423726E-05	8.423726E-05
	2,3,4		.0123956776	.0123956776	.0123956776		
	2,3,5		.0018277781	.0018277781		.001827781	
	2,3,6		-.0167120339	-.0167120339			-.0167120339
	2,4,5		-.0033565449		-.0033565449	-.0033565449	
	2,4,6		-.007878595		-.007878595		-.007878595
	2,5,6		.0054342757			.0054342757	.0054342757
	3,4,5			-.0026601921	-.0026601921	-.0026601921	
	3,4,6			-.0071725782	-.0071725782		-.0071725782
	3,5,6			.0083957461		.0083957461	.0083957461
	4,5,6				.0003121952	.0003121952	.0003121952
Common to	1,2,3,4	.0090748759	.0090748759	.0090748759	.0090748759		
	1,2,3,5	-.0101422334	-.0101422334	-.0101422334		-.0101422334	
	1,2,3,6	.0121789337	.0121789337	.0121789337			.0121789337
	1,2,4,5	-.0025560615	-.0025560615		-.0025560615	-.0025560615	
	1,2,4,6	-.0114406196	-.0114406196		-.0114406196		-.0114406196
	1,2,5,6	.0148903486	.0148903486			.0148903486	.0148903486
	1,3,4,5	-.0043084706		-.0043084706	-.0043084706	-.0043084706	
	1,3,4,6	.0004540109		.0004540109			.0004540109
	1,3,5,6	-.0025625009	-.0025625009		-.0025625009	-.0025625009	-.0025625009
	1,4,5,6	-.0004129054		-.0004129054	-.0004129054	-.0004129054	-.0004129054
	2,3,4,5		.005020302	.005020302		.005020302	
	2,3,4,6		.0186985339	.0186985339			.0186985339
	2,3,5,6		.0133688866	.0133688866		.0133688866	.0133688866
	2,4,5,6		-.0058725921		-.0058725921	-.0058725921	-.0058725921
	3,4,5,6			-.0028616546	-.0028616546	-.0028616546	-.0028616546
Common to	1,2,3,4,5	-.0019147434	-.0019147434	-.0019147434	-.0019147434	-.0019147434	
	1,2,3,4,6	.0114867046	.0114867046	.0114867046			.0114867046
	1,2,3,5,6	-.0208706209	-.0208706209	-.0208706209		-.0208706209	-.0208706209
	1,2,4,5,6	-.0084623684	-.0084623684		-.0084623684	-.0084623684	-.0084623684
	1,3,4,5,6	-.0024334286		-.0024334286	-.0024334286	-.0024334286	-.0024334286
	2,3,4,5,6		-.0158118895	-.0158118895	-.0158118895	-.0158118895	-.0158118895
Common to	1,2,3,4,5,6	.0099282806	.0099282806	.0099282806	.0099282806	.0099282806	.0099282806
(r ² with CAIR)		.0646398266	.0411992128	.0121988413	.0322841907	.0017007697	.0824063778

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Appendix K

SUMMARY DATA ON REGRESSION MODEL OF CAREER AWARENESS INSTRUCTION

The equation, in standard form:

$$\hat{Z}_y = .149Z_2 + .311Z_3 - .393Z_4 + .303Z_7 - .047Z_8 - .126Z_9$$

$$R = .3824034435$$

The variables:	R ²	F ratio	df	p
All	.1462323936	10.5974656	6, 371	7.301579E-11
2. Years in Career Lab				
simple corr.	.0646398266	25.98418824	1, 376	5.464568E-07
last entered	.0049754177	2.162040294	1, 371	.142304319
3. Goal Agreement				
simple corr.	.0411992128	16.15654078	1, 376	7.047298E-05
last entered	.022212626	9.652374	1, 371	.002036725
4. Career Stations Preferred				
simple corr.	.0121988413	4.643408545	1, 376	.0318074681
last entered	.0234497811	10.18997292	1, 371	.0015325743
7. Stations Completed				
simple corr.	.0322841907	12.54382286	1, 376	.0004474659
last entered	.0201616122	8.761117276	1, 371	.0032748677
8. Time-on-each-station				
simple corr.	.0017007697	.640578888	1, 376	.4240066478
last entered	.0005705759	.2479406074	1, 371	.6188239275
9. Additional Career Experiences				
simple corr.	.0824065776	33.76754073	1, 376	1.32538E-08
last entered	.008500575	3.693877937	1, 371	.0553781267

Appendix L

ANALYSIS OF COVARIANCE SUMMARY: COMPARISON OF SCHOOLS ON CAI POSTTEST SCORES, WITH FIVE COVARIATES

K = 11 schools

N = 378 fifth grade students

Covariates:

- X₁. CAI pretest,
- X₂. Goal Agreement,
- X₃. Career Station Preference,
- X₄. Stations Completed,
- X₅. Additional Career Experiences,

b₁ = .7009642894
b₂ = 10.22094306
b₃ = -29.81729794
b₄ = 1.089595503
b₅ = -.2850764594

ANOVA of residuals

Source	df	SS	MS
Between	10	2037.721	203.772
Within	367	45698.158	124.518
Total	377	47735.879	XXX
F = 1.636 df = 10, 367 p = .094			

Posttest means

School	unadjusted	adjusted for Pretest	adjusted for five variables
1	99.59	95.40	91.79
2	92.24	94.98	91.35
3*	87.41	94.05	92.79
4*	103.09	92.99	86.59
5*	90.37	92.26	87.58
6	92.00	83.32	95.97
7*	88.59	88.27	87.18
8*	79.30	88.38	88.99
9	76.67	85.60	91.19
10	76.18	82.46	85.31
11	83.70	81.88	89.19

*indicates a Chapter II school